

PATENT COOPERATION TREATY

DOCKETED
PCT

From the INTERNATIONAL BUREAU

NOTIFICATION CONCERNING
TRANSMITTAL OF COPY OF INTERNATIONAL
PRELIMINARY REPORT ON PATENTABILITY
(CHAPTER I OF THE PATENT COOPERATION
TREATY)

(PCT Rule 44bis.1(c))

To:

CARROLL, Alice, O.
Hamilton, Brook, Smith & Reynolds, P.C.
530 Virginia Road
P.O. Box 9133
Concord, MA 01742-9133
ETATS-UNIS D'AMERIQUE

Date of mailing (day/month/year)

22 December 2005 (22.12.2005)

Applicant's or agent's file reference

3194.1026004

IMPORTANT NOTICE

International application No.

PCT/US2004/017251

International filing date (day/month/year)

01 June 2004 (01.06.2004)

Priority date (day/month/year)

02 June 2003 (02.06.2003)

Applicant

ENTEGRIS, INC. et al

The International Bureau transmits herewith a copy of the international preliminary report on patentability (Chapter I of the Patent Cooperation Treaty)

RECEIVED

Rec'd IFD

DEC 29 2005

HAMILTON, BROOK
SMITH & REYNOLDS, P.C.The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Authorized officer

Philippe Becamel

Facsimile No.+41 22 740 14 35

Facsimile No.+41 22 338 70 90

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

| | | |
|--|--|--|
| Applicant's or agent's file reference 3194.1026004 | FOR FURTHER ACTION | See item 4 below |
| International application No. PCT/US2004/017251 | International filing date (<i>day/month/year</i>) 01 June 2004 (01.06.2004) | Priority date (<i>day/month/year</i>) 02 June 2003 (02.06.2003)] |
| International Patent Classification (IPC) or national classification and IPC 7 H01L 21/306, B01D 53/00, 53/72 | | |
| Applicant ENTEGRIS, INC. | | |

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

- | | | |
|-------------------------------------|--------------|---|
| <input checked="" type="checkbox"/> | Box No. I | Basis of the report |
| <input checked="" type="checkbox"/> | Box No. II | Priority |
| <input type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| <input type="checkbox"/> | Box No. IV | Lack of unity of invention |
| <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/> | Box No. VI | Certain documents cited |
| <input checked="" type="checkbox"/> | Box No. VII | Certain defects in the international application |
| <input checked="" type="checkbox"/> | Box No. VIII | Certain observations on the international application |

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).

| | |
|---|--|
| The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. +41 22 740 14 35 | Date of issuance of this report 08 December 2005 (08.12.2005) Authorized officer <div style="text-align: center; font-weight: bold; font-size: 1.2em;">Philippe Becamel</div> Telephone No. +41 22 338 70 90 |
|---|--|

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

REC'D 05 NOV 2004

PCT

To:

WIPO

PCT

see form PCT/ISA/220

23/12

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.1)

Date of mailing

(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION

See paragraph 2 below

International application No.
PCT/US2004/017251

International filing date (day/month/year)
01.06.2004

Priority date (day/month/year)
02.06.2003

International Patent Classification (IPC) or both national classification and IPC
H01L21/306, B01D53/00, B01D53/72

Applicant
MYKROLIS CORPORATION

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION:**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1 bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized Officer

Kanoldt, W

Telephone No. +49 89 2399-8633



**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2004/017251

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2004/017251

Box No. II Priority

1. ☒ The following document has not been furnished:

- ☒ copy of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(a)).
- ☐ translation of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if necessary:

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | |
|-------------------------------|-------------|------|
| Novelty (N) | Yes: Claims | 1-35 |
| | No: Claims | |
| Inventive step (IS) | Yes: Claims | |
| | No: Claims | 1-35 |
| Industrial applicability (IA) | Yes: Claims | 1-35 |
| | No: Claims | |

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item VIII:

1. The claims are not clear (Article 6 PCT) as follows:

1.1 It is not understood why more than one independent claim in the same category is necessary. The various definitions of the invention given in the independent claims 1, 2, 16 and 24 are such that the claims as a whole are not clear and concise, contrary to Article 6 PCT. The claims should be recast to include only the minimum necessary number of independent claims in any one category, Rule 13.3 PCT, with dependent claims as appropriate, Rule 6.4 PCT.

Claim 1 is regarded as the broadest claim. The other independent claims could apparently be formulated dependent on this claim.

1.2 In the chapter "summary of the invention" the independent claims are reflected. But some of the features (see p. 4, 32 and p. 5, l. 12) are preferable according to the description, but obligatory in the corresponding claims. Thus, the claims are not clear in the light of the description.

Moreover, the dependent claims are not reflected completely in the description and thus are not supported.

1.3 In the description, the problem to be solved (page 4, ls. 29, 30) is described as to provide a method for the removal of AMCs from surfaces. But in the examples, exclusively different hydrocarbons are removed. Thus, a generalization to all possible AMCs is regarded to be speculative. In this context, the explanation concerning AMCs given on page 2 is misleading, as also moisture and oxygen is included in the open list of possible AMCs, but in the following sentence these two substances are excluded. This contradiction makes the expression "AMC" not clear.

From the first chapter of the description it becomes immediately clear that the application concerns the removal of substances on surfaces of high purity products such as silicon wafers. Contrary to this, the independent claims only mention a "surface" in general. Thus, the "surfaces" are not clearly defined in the claims.

- 1.4 From the description, it can be concluded (see pages 8, 9) that the purified purge gas shall contain, beside inert gases, "active" gases showing a chemical effect. Only water and oxygen are named and their effectiveness is demonstrated in the examples. From the description it is also clear that no other impacting effects like plasma or radiation or the use of known more aggressive gases like chlorine shall be applied. But the claims are not restricted to these disclosed features. All additional energetic and chemical effects which are apparently not meant, are in addition possible according to the formulation of the claims.
- 1.5 In the following, the claims are read as concerning the removal of hydrocarbons from high purity products such as silicon wafers.

Re Item V:

1. The following document is referred to in this communication:
- D1 : WO 01/37329 A (LUCENT TECHNOLOGIES INC) 25 May 2001 (2001-05-25)
D2 : EP 0 867 924 A (IMEC INTER UNI MICRO ELECTR) 30 September 1998 (1998-09-30)
D3 : US 2002/088478 A1 (DEGENDT STEFAN ET AL) 11 July 2002 (2002-07-11)
D4 : DE 199 24 058 A (BOSCH GMBH ROBERT) 30 November 2000 (2000-11-30)
D5 : US 6 124 211 A (BUTTERBAUGH JEFFERY W ET AL) 26 September 2000 (2000-09-26)
D6 : US 5 938 854 A (ROTH JOHN REECE) 17 August 1999 (1999-08-17)
- 2.1 As the claims are not clear (see above) only a more general statement to present claim 1 in view of the above clarifications (see re item VIII, 1.5, above) can be given.
- 2.2 Document D1 is regarded to perform the closest present prior art. It shows (see p. 4, ls. 15, 16; claims 1 - 9, 36) a method for the removal of airborne hydrocarbons from a wafer surface comprising purifying a portion of the wafer surface with a gas

containing water vapor. The taking up of hydrocarbons (and respective reaction products) producing a contaminated purge gas and the removal of this purge gas is self-evident.

Claim 1 differs in that the purge gas before contacting shall have a purity of less than 1 vol-ppb AMCs.

Thus, claim 1 is novel (Article 33(2) PCT), but no inventive activity can be acknowledged (Article 33(3) PCT), as it is known to a skilled person (application, page 8, ls. 26 -31) that in order to finally purge a wafer surface, it is necessary to have a UHP gas. Otherwise, the required purity - either after physical rinsing or chemical removing from contaminants - cannot be reached.

In D1, no purity is given. As already mentioned, the skilled man knows that in case of a final purification (e.g. before using the wafer in chip production) step, the required surface purity can only be achieved when the treating gas does not contain more impurities than the usual gas atmosphere in the further production step.

- 2.3 Documents D2 - D6 show all a similar prior art. The main difference is that the origine of the hydrocarbons is not expressed, what is not regarded as essential.
- 2.4 Concerning the other claims (2 - 35), in view of the unclear formulations (see 2.1, above) it can only be said that these claims seem to contain solution details which cannot be regarded as inventive (Article 33(3) PCT).

The industrial applicability (Article 33(4) PCT) is beyond doubt.

Re Item VII:

1. No relevant prior art documents are mentioned in the introduction of the description